

## SHORT NOTE

### Predation by Australasian harrier (*Circus approximans*) of little shag (*Phalacrocorax melanoleucos*) clutches

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The Australasian harrier (*Circus approximans*) takes eggs and nestlings of a variety of bird species, including ground and tree nesters (Marchant & Higgins 1993). Few such events are witnessed, and it is not possible to determine from diet studies whether food items were the result of predation or scavenging. C.W. Matthews (pers. comm.) saw a harrier prey upon 9 little shag (*Phalacrocorax melanoleucos*) clutches on a maimai (duck-shooter's hide) at Hamilton's Lagoon, Manawatu, and Parkin (1950) saw a harrier raiding eggs from a pied shag (*Phalacrocorax varius*) colony on Little Barrier Island, Hauraki Gulf.

Time-lapse video equipment enables activities at nests to be recorded continuously, day and night (Innes *et al.* 1994), providing a full account of a species' nesting activities, and a means of identifying predators at nests (Brown *et al.* 1998; Sanders & Maloney 1999). Using such equipment we observed harriers preying upon 2 little shag clutches. The shags were nesting in willows (*Salix* spp.) at the Lindale Tourist Complex near Paraparaumu (Powlesland & Luke 2000). The equipment consisted of a Panasonic® AG 1070 time-lapse video cassette recorder, a black-and-white camera, and an infra-red light source. Date, and time of day (New Zealand Standard Time) were recorded on tape to allow determination of the timing and duration of events. The camera and cable were set in place when the shags were nest-building

or incubating, and once operational, video monitoring was maintained continuously until chicks fledged or the nesting attempt failed.

#### 1999/2000 breeding season

The equipment was installed for the first time on 22 August 1999. As well as the focal nest (nest A), 4 other occupied nests were in view. Recordings were obtained for 64 24-h periods during 72 days, until the brood fledged on 31 October. At no time was a harrier visible on the tapes, nor was any shag seen to assume an alarm posture.

#### 2000/2001 breeding season

Activities at nest B (no other nests in view) were recorded from 30 August until 18 September (20 days), and 26 September to 15 October (20 days) during which no shags in alarm posture or harrier were visible on the tapes. Likewise, during 18-26 September, when activities at nest C and 3 other nests in the background were recorded, no shags in alarm posture or harriers were seen on the tapes.

Recording at nest C was resumed on 15 October 2000. On 23 October, the incubating or brooding shags suddenly became alarmed (sleeked plumage, neck up-stretched), and looked towards the canopy. The event culminated in 2 of the 4 shags assuming a high intensity threat posture, similar to that depicted in Matthews & Fordham (1986). This involved them, with necks up-stretched, rising to a crouch or stand, and rapidly spreading their wings and tails (Fig. 1). Five times on the next day the nesting shags again became alarmed and appeared to watch something



Fig. 1 Nesting little shag (*Phalacrocorax meloleucos*) in alarm posture at close approach of harrier (*Circus approximans*).

moving overhead. Again, 4 times during 26 October, and twice during 5 November, a few shags assumed the alarm posture. At no time during any of these episodes was there an obvious reason evident on the tapes for the shags becoming alert and displaying. Also, of the 14 occupied nests (12 containing nestlings and 2 with clutches) present at the time, none failed during October – early November.

On 11 November, the camera was shifted to nest D where incubation of a 4-egg clutch was in progress. Three days later at 0518 h, the female shag displayed intensively; spread both wings, rose to a crouch, neck erect, and beak agape as though alarm calling. Almost immediately she left the nest, and 25 s later a harrier landed on the nest. The harrier was a juvenile with a pale nape patch (Marchant & Higgins 1993). It had no difficulty breaking into the eggs using its beak, and departed at 0535 h having eaten all the eggs. The shag returned 1 min later, flicked a few shell fragments out of the nest, and then sat on the remainder. Over the following 90 min, she removed most of the remaining shell fragments, and at 0911 h abandoned the nest. The male returned from foraging at 1156 h, removed the few remaining shell fragments, spent the rest of the day on or by the nest, and then abandoned it the next morning.

Five days before the harrier predation at nest D there had been 25 occupied nests at the colony. Of these, broods at 12 were either close to leaving the nest or had done so and were roosting elsewhere in the willows, and 1 brood was about a week old. At the other 12 nests, it was assumed that incubation was in progress because there had been a sitting bird on each. However, it is possible that a few

birds were brooding recently-hatched chicks or had yet to lay. By 16 November, when each nest was checked again, the 13 nests that had had sitting adults had been abandoned. Only the broods that had left their nests or that were almost full-grown were still present. Because we had not seen any other species of aerial predator about the colony, nor was there a previous occasion when so many nesting attempts failed during a few days, we assume that the 13 nests were abandoned because of harrier predation.

On 17 December, the camera was set up at nest E where a pair was refurbishing the nest. During 17–24 December, before egg-laying, the shag or shags at this nest became alarmed, and left suddenly on 7 occasions, adopting the alarm posture only once before leaving. Three times, the departure of the shag(s) was followed quickly by the arrival of a harrier, which remained for about 1 min each time. The female laid the 1st egg on 25 December. On 26 December, both members of the pair were at the nest, the female covering the egg. Suddenly she assumed the alarm posture, and then both left quickly. Within 30 s a juvenile harrier landed on the nest and began to eat the egg. When much of the egg had been eaten, an adult harrier displaced the juvenile, and ate the remaining egg contents. The shags returned about 5 minutes later and flicked the shell fragments from the nest. Although both shags visited the nest the following morning at dawn, they abandoned it soon after.

Harrier predation of little shag eggs and young chicks occurred only in the 4th year of our study at the Lindale colony (Powlesland & Luke 2000), even though harriers were present in the area throughout. Such predation may result when an individual harrier learns that it is able to frighten off adult little shags from their nests and then eat any eggs and young chicks. Little shags are occasionally found nesting in mixed colonies with pied shags or black shags (*Phalacrocorax carbo*) (Heather & Robertson 1996), perhaps because the presence of these larger shag species gives them some protection from harrier predation. Harriers were seen regularly at a black shag colony near Wellington, sometimes hovering above occupied nests, and pursuing a shag in flight (Powlesland & Reese 2000). Although the harriers were never seen to flush a black shag from its nest nor to capture one in flight, Parkin's (1950) observations of a harrier taking pied shag eggs indicate that harriers are sometimes successful at taking eggs from nests of these large shags. The frequency of harrier predation at little shag colonies is unknown but possibly it is more frequent now than before European settlement. Harrier numbers have increased following the conversion of forests to farmland, and the introduction of small mammals

and birds, which form much of their prey (Heather & Robertson 1996). Little shag numbers have increased markedly in the Wellington region since the mid 1970s (Robertson 1992; Powlesland & Luke 2000), and so it seems that harrier predation of little shag eggs and young chicks has not affected the population level.

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## SHORT NOTE

### Why were Providence petrels (*Pterodroma solandri*) nocturnal at Norfolk Island?

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There is no reason to believe that the Providence petrels (*Pterodroma solandri*) that formerly nested on Norfolk Island were any different taxonomically to the Providence petrels

that nest on Lord Howe Island. However, there is evidence for a significant difference in behaviour between the 2 populations.

At Lord Howe Island, Providence petrels come to the island and are active over their nesting grounds during the day in the breeding season. McCullough (1921) observed Providence petrels

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